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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/564,735	07/31/2006	Mario Bergeron	055189-0016	5181
20572 7590 06/06/2008 GODFREY & KAHN S.C. 780 NORTH WATER STREET MILWAUKEE, WI 53202				
EXAMINER				
SHEVIN, MARK L				
ART UNIT		PAPER NUMBER		
1793				
MAIL DATE		DELIVERY MODE		
06/06/2008		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/564,735

Applicant(s)

BERGERON ET AL.

Examiner

Mark L. Shevin

Art Unit

1793

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-34 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 January 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SF/US)
- Paper No(s)/Mail Date 07/31/2006
- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date ____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: ____

DETAILED ACTION

Status

1. Claims 1-34, filed as a preliminary amendment on January 19th, 2006, are pending.

Priority

2. Applicant's claim to priority of U.S. provisional application 60/489,904, filed July 25th, 2003 and Canadian application 2,435,779, filed July 22nd, 2003, have been recorded.

Information Disclosure Statement

3. The information disclosure statement (IDS) submitted July 31st, 2006 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement has been considered by the examiner. Please refer to applicants' copy of the 1449 form submitted herewith.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. **Claims 1-34** are rejected under 35 U.S.C. 103(a) as being unpatentable over **WO '724** (Lalancette et al, WO 97/46724) in view of **CA '783** (Lalancette et al, CA 2,193,783), **WO '788** (Lalancette, WO 02/053788), and **Kanari** (N Kanari et al, A study of chromite carbochlorination kinetics, *Metallurgical and Materials Transactions B*, Vol. 30B, (August 1999), p. 577-587).

WO '724

WO '724, drawn to a process for obtaining chromium-rich chromite, teaches that chlorine is a very selective reagent for the recovery of platinoids (PGM), leaving most of the chromite unaltered (p. 3, line 20 to p. 4, line 1) and that by adjusting appropriate operating conditions and in the presence of NaCl, iron oxide in chromite can be oxidized to hematite, thus increasing the Cr/Fe ratio in the residual insoluble chromite. The resultant hematite is readily soluble in HCl and can be thus be removed by acid washing, along with the soluble ferric chloride (FeCl₃) formed during chlorination (p. 4, lines 9-14).

The ore is dry chlorinated at a temperature of between 400 and 750°C in the presence of NaCl (p. 5, lines 3-7 and 13-15). The temperature of the dry chlorination step is a result effective variable depending on the refractoriness of the ore under treatment and the capacity of treatment of a given apparatus (p. 7, line 15 - p. 9, line 5).

The reaction time is 0.5 to 2 hours, depending on the nature of the ore, the degree of completion desired, the temperature used, and the granulometry of the ore (p. 9, lines 10-14).

WO '724 does not teach does not teach the recovery of PGM metals nor the use of CO gas.

CA '783

CA '783, drawn to a process for recovering platinum group metals (PGM) from PGM-bearing chromite ores or concentrates (p. 1, lines 5-7), teaches the dry chlorination of chromite in the presence of NaCl at a temperature of between 350 and 800°C (p. 5, line 16-23).

The advantage of this PGM recovery process is that PGM recovery is 10 to 20% higher than pyrometallurgical methods, osmium is recovered much more effectively, and is modular and thus less capital intensive than pyrometallurgical processes (p. 6, line 23 to p. 7, line 8).

The chlorination temperature is a result effective variable depending on the type of ore and must be high enough to ensure desired reactions with PGM but low enough to avoid detrimental reactions with equipment and side reactions with chromite (p. 8, lines 10-24).

The addition of NaCl produces soluble chlorides with some of the PGM that would otherwise give insoluble chlorides (p. 11, lines 5-15).

WO '788

WO '788, drawn to a method for the recovery of various metals, including precious metals, from fresh ore, mine tailings and industrial waste in one type of operation (p. 3, lines 1-5).

WO '788 further expands on the salt concentration taught in WO '724 and CA '783 in teaching that it is necessary to have a source of chloride ions, normally, NaCl, present in the reaction mixture so as to have the available in situ chloride ion concentration required for the solubilisation at the time of leaching, upon completion of the chlorination step (p. 6, lines 10-17). KCl or CaCl_2 could also be used as salts (p. 6, lines 17-18). The salt content should be about 5 wt% (p. 10, lines 12-21).

Kanari:

Kanari, drawn to the study of carbochlorination of chromite concentrate to increase its Cr/Fe ratio through selective chlorination of the iron compounds (p. 577, col. 1, para 2 to col. 2, para 1). Previous research had suggested that carbochlorination reaction rate decreases at temperatures above 800°C due to the decomposition of COCl_2 formed in situ.

The phase stability diagrams of (Cr, Fe, Mg, Al, Si) - O - Cl systems suggested that chlorides were the stable phases during chlorination of oxides in the presence of a reducing atmosphere, (p. 579, col. 2). Using carbon monoxide as the reducing atmosphere permits the volatilize of Si, Al, and Fe chlorides leading to a residue rich in chromium compounds (p. 580, col. 1, para 1-2).

Figures 8a and 8b teach the dependence of the iron and chromium recovery on the carbochlorination temperature and reaction time (p. 581).

Figure 11 teaches the effect of gas flow rate on the carbochlorination of chromite at 1000°C and suggests that gas flow rates of about 60 L/h (1000 mL/min) maximize the reaction rate (p. 583).

Lastly Kanari teaches that the maximum reaction rate was for a gas mixture with an almost equimolar Cl_2 and CO content (Cl_2/CO ratio of ~ 1 , p. 585, col. 2, para 2).

Regarding claim 1, it would have been obvious to one of ordinary skill in chromite metallurgy, at the time the invention was made, taking the disclosures of WO '724, CA '783, WO '788, and Kanari as a whole, to modify the process of WO '724 to include the recovery of PGM as taught by CA '783 and WO '788 using a salt content to convert at least one PGM into a corresponding PGM chloride salt, and contacting the mixture with Cl_2 gas (as taught by WO '727, CA '783, and WO '788) and CO (as taught by Kanari) to recover said PGM chloride salt(s) for the following reasons:

WO '724 taught the general process of upgrading chromite ore by chlorination and referenced CA '783 which taught that this same process recovers selectively recovers PGM, thus motivated coming from WO '724 suggestion that the same chlorination process in the presence of NaCl both upgrades chromite to increase the Cr/Fe ratio and recovers PGM metals. CA '783, along with WO '788 go into further detail describing the use of the salt as it renders otherwise insoluble PGM metals such as iridium soluble (CA '783) and adds chloride ions to the solution to increase recovery (CA '783 and WO '788). Finally Kanari teaches the use of CO in addition to Cl_2 gas in that CO produces a reducing atmosphere and permits the volatilize of Si, Al, and Fe chlorides leading to a residue rich in chromium compounds (p. 580, col. 1, para 1-2).

Regarding claims 2-10, WO '724 teaches that the temperature of the dry chlorination step is a result effective variable depending on the refractoriness of the ore under treatment and the capacity of treatment of a given apparatus (p. 7, line 15 - p. 9,

line 5). Furthermore, CA '783 teaches that the chlorination temperature is a result effective variable depending on the type of ore and must be high enough to ensure desired reactions with PGM but low enough to avoid detrimental reactions with equipment and side reactions with chromite (p. 8, lines 10-24). Finally Kanari, in figures 8a and 8b on p. 581, teaches the dependence of the iron and chromium recovery on the carbochlorination temperature and reaction time. It would have been obvious to one of ordinary skill in the art at the time of the invention to choose the instantly claimed ranges through process optimization, since it has been held that there the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See In re Boesch, 205 USPQ 215 (CCPA 1980). MPEP 2144.05, para I states: "In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists."

Regarding claim 11, Kanari, in Figure 11, teaches the effect of gas flow rate on the carbochlorination of chromite at 1000°C and suggests that gas flow rates of about 60 L/h (1000 mL/min) maximize the reaction rate (p. 583). It would have been obvious to one of ordinary skill in the art at the time of the invention to choose the instantly claimed ranges through process optimization, since it has been held that there the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See In re Boesch, 205 USPQ 215 (CCPA 1980). MPEP 2144.05, para I states: "In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists."

Regarding claims 12 and 13, WO '724 (p. 5, lines 3-7 and 13-15), CA '783 (p. 11, lines 5-15), and WO '788 (p. 6, lines 17-18), teach the use of NaCl.

Regarding claims 14 and 15, WO '788 teaches that it is necessary to have a source of chloride ions, normally, NaCl, present in the reaction mixture so as to have the available in situ chloride ion concentration required for the solubilisation at the time of leaching, upon completion of the chlorination step (p. 6, lines 10-17) and that the salt content should be about 5 wt% (p. 10, lines 12-21). MPEP 2144.05, para I states: "In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists."

Regarding claim 16, it would have been obvious to one of ordinary skill in chromite metallurgy, taking the disclosures of WO '724, CA '783, WO '788, and Kanari as a whole, to modify the process of WO '724 to include the recovery of PGM as taught by CA '783 and WO '788 using a salt content to convert at least one PGM into a corresponding PGM chloride salt, and contacting the mixture with Cl₂ gas (as taught by WO '727, CA '783, and WO '788) and CO (as taught by Kanari) to recover said PGM chloride salt(s) for the following reasons:

WO '724 taught the general process of upgrading chromite ore by chlorination and referenced CA '783 which taught that this same process recovers selectively recovers PGM, thus motivated coming from WO '724 suggestion that the same chlorination process in the presence of NaCl both upgrades chromite to increase the Cr/Fe ratio and recovers PGM metals as required by the preamble of claim 16. CA '783, along with WO '788 go into further detail describing the use of the salt as it

renders otherwise insoluble PGM metals such as iridium soluble (CA '783) and adds chloride ions to the solution to increase recovery (CA '783 and WO '788), thus providing step a. Finally Kanari teaches the use of CO in addition to Cl₂ gas in that CO produces a reducing atmosphere and permits the volatilize of Si, Al, and Fe chlorides leading to a residue rich in chromium compounds (p. 580, col. 1, para 1-2), providing step b and step c as taught by the primary reference WO '724.

Regarding claims 17-20, WO '724 (p. 5, lines 3-7 and 13-15), CA '783 (p. 11, lines 5-15), and WO '788 (p. 6, lines 17-18), teach the use of NaCl. WO '788 teaches that it is necessary to have a source of chloride ions, normally, NaCl, present in the reaction mixture so as to have the available in situ chloride ion concentration required for the solubilisation at the time of leaching, upon completion of the chlorination step (p. 6, lines 10-17) and that the salt content should be about 5 wt% (p. 10, lines 12-21). MPEP 2144.05, para I states: "In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists."

Regarding claims 21 and 22, Kanari, in Figure 11, teaches the effect of gas flow rate on the carbochlorination of chromite at 1000°C and suggests that gas flow rates of about 60 L/h (1000 mL/min) maximize the reaction rate (p. 583). It would have been obvious to one of ordinary skill in the art at the time of the invention to choose the instantly claimed ranges through process optimization, since it has been held that there the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See In re Boesch, 205 USPQ 215 (CCPA 1980). MPEP 2144.05, para I states: "In the case where the claimed

ranges "overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists."

Regarding claims 23 and 24, WO '724 teaches that the temperature of the dry chlorination step is a result effective variable depending on the refractoriness of the ore under treatment and the capacity of treatment of a given apparatus (p. 7, line 15 - p. 9, line 5). Furthermore, CA '783 teaches that the chlorination temperature is a result effective variable depending on the type of ore and must be high enough to ensure desired reactions with PGM but low enough to avoid detrimental reactions with equipment and side reactions with chromite (p. 8, lines 10-24). Finally Kanari, in figures 8a and 8b on p. 581, teaches the dependence of the iron and chromium recovery on the carbochlorination temperature and reaction time. It would have been obvious to one of ordinary skill in the art at the time of the invention to choose the instantly claimed ranges through process optimization, since it has been held that there the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See In re Boesch, 205 USPQ 215 (CCPA 1980). MPEP 2144.05, para I states: "In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists."

Regarding claims 25 and 30, Kanari teaches that the maximum reaction rate was for a gas mixture with an almost equimolar Cl₂ and CO content (Cl₂/CO ratio of ~1, p. 585, col. 2, para 2).

Regarding claims 26 and 31, WO '724 (p. 7, lines 12-15) and CA '783 (p. 8, lines 5-7) teach that the mixture is dried before chlorination.

Regarding claims 27 and 32, WO '724 (p. 9, lines 3-6) and CA '783 (p. 9, lines 16-19) teach the use of nitrogen as a carrier gas.

Regarding claims 28-29 and 33-34, WO '724 teaches that the reaction time is 0.5 to 2 hours, depending on the nature of the ore, the degree of completion desired, the temperature used, and the granulometry of the ore (p. 9, lines 10-14). MPEP 2144.05, para I states: "In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists."

Conclusion

-- Claims 1-34 (All pending) are rejected
-- No claims are allowed

The rejections above rely on the references for all the teachings expressed in the text of the references and/or one of ordinary skill in the metallurgical art would have reasonably understood or implied from the texts of the references. To emphasize certain aspects of the prior art, only specific portions of the texts have been pointed out. Each reference as a whole should be reviewed in responding to the rejection, since other sections of the same reference and/or various combinations of the cited references may be relied on in future rejections in view of amendments.

All recited limitations in the instant claims have been met by the rejections as set forth above. Applicant is reminded that when amendment and/or revision is required, applicant should therefore specifically point out the support for any amendments made to the disclosure. See 37 C.F.R. § 1.121; 37 C.F.R. Part §41.37 (c)(1)(v); MPEP §714.02; and MPEP §2411.01(B).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark L. Shevin whose telephone number is (571) 270-3588. The examiner can normally be reached on Monday - Thursday, 8:30 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1793

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mark L. Shevin/

/Roy King/

Supervisory Patent Examiner, Art Unit 1793

10-564,735
June 2nd, 2008.